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A New Neoschöngastia (Acarina: Trombiculidae) from Western Kansas and Eastern Colorado.[1, 2]

By D. A. CROSSLEY, JR., and RICHARD B. LOOMIS

Studies of nymphs of the chigger genus *Neoschöngastia* revealed the presence of two distinct types in Kansas. Subsequent study of larvae revealed less conspicuous features correlated with the nymphal types. One of the species seems to be *Neoschöngastia americana* (Hirst), while the second is herein named *Neoschöngastia brennani.*

The known range for *Neoschöngastia americana,* excluding the supposed subspecies *N. a. solomonis* Wharton and Hardcastle from the Pacific area, includes Guatemala and Jamaica (Brennan, 1951), Mexico (Hoffman, 1950: 153) and the United States from Virginia and South Carolina (Wharton and Hardcastle, 1946: 289) west to Kansas. *Neoschöngastia americana* has been examined from northwestern and eastern Kansas, Missouri, Oklahoma, Arkansas, Louisiana, and Texas, and was common on birds and rabbits. *Neoschöngastia brennani* was taken in southwestern Kansas and eastern Colorado, and has been recovered only from birds.

In the following description the terminology is essentially that of Wharton *et al.* (1951) with some minor changes; see Audy (1952: 152) for the use of tarsala and microtarsala in place of spur and microspur on the tarsi. Measurements are given in microns.

[1] This investigation was supported in part by a research grant (E-476) from the National Microbiological Institute of the National Institutes of Health, Public Health Service.

[2] Contribution No. 896 of the Department of Entomology, University of Kansas.

Neoschöngastia brennani new species [3]

Diagnosis. Larva: Similar to *Neoschöngastia americana* (Hirst) but differs in having two genualae I, sensilla with many small setules, scutal setae more plumose, cheliceral base with punctae fewer and larger and restricted to basal portion, legs with punctae fewer and larger especially on distal segments.

Description of larva. Body: Holotype 412 by 369 (partially engorged), color orange to pale red in life. Eyes 2/2, red in life, anterior eye larger, ocular plate well defined, distance across both eyes of one side in holotype 26.

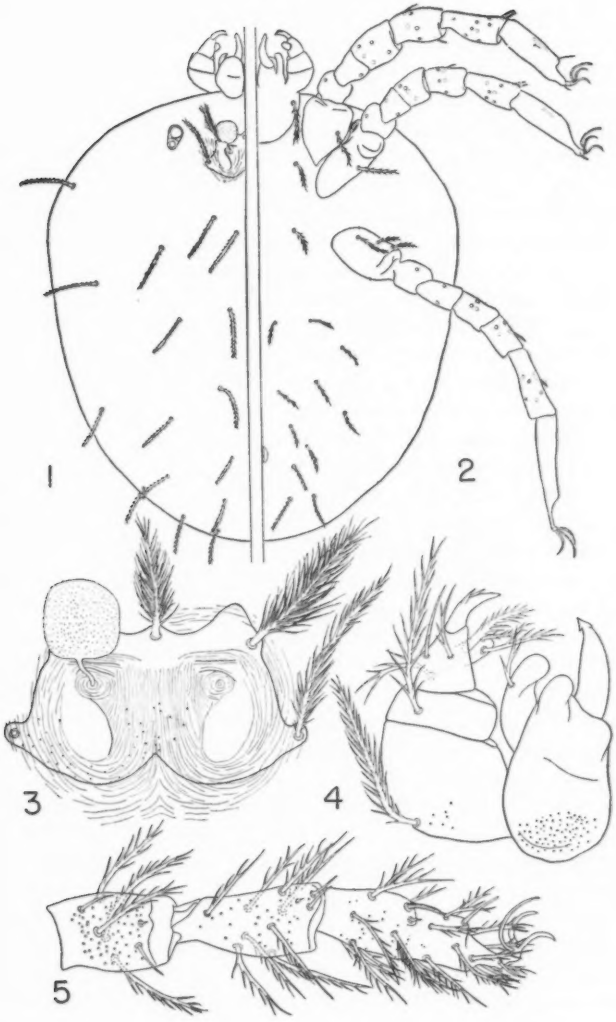
Dorsal setal formula 2-8-6-6-4-4-2, total 32; humeral seta measures 44, anterior dorsal seta 46, posterior dorsal seta 28. Ventral setal formula 2-2- plus 16 preanal, 6 postanal, total 26; sternal seta measures 35, anterior ventral seta 27, posterior ventral seta 31. Total body setae 58.

Scutum: Shape roughly rectangular, wider than long, anterior and lateral margins sinuous as illustrated, posterior margin deeply indented at the midpoint. Punctae large, sparse, mostly restricted to posterior portion. Cuticular striae covering the majority of the scutum, only the anterior portion free. Scutal setae, especially the AM and ALs, with many long fine branches; sensillary bases closer to anterior margin than posterior. Sensillae strongly capitate and with fine setules. Scutal measurements of holotype: AW—47, PW—70, SB—31, ASB—18, PSB—26, AM—32, AL—40, PL—45, AP—28, S—25. Averages and extremes of ten paratypes: AW—45 (42–50), PW—65 (57–71), SB—31 (28–34), ASB—17 (14–20), PSB—27 (25–28), AM—30 (28–32), AL—41 (36–45), PL—47 (43–50), AP—29 (27–32), S—27 (23–31).

[3] Named in honor of Dr. James M. Brennan, National Institutes of Health, Hamilton, Montana, in appreciation of his excellent studies of North American trombiculids and for the aid given to the authors in identification of chigger mites.

EXPLANATION OF PLATE

Neoschöngastia brennani larva. Fig. 1, dorsal view of body. Fig. 2, ventral view of body. Fig. 3, scutum. Fig. 4, dorsal view of left side of gnathosoma. Fig. 5, lateral view of distal segments of Leg I.



FIGS. 1–5.

Gnathosoma: Cheliceral blade long and slender, slightly curved, with one prominent dorsal tricuspid cap and a small ventral projection. Cheliceral base roughly rectangular, with punctae large and restricted to the basal portion. Galeal seta with one to three branches (two branches in holotype). Capitular sternum with one pair of branched setae. Palpal femur and genu each with one branched seta; tibia with dorsal and ventral setae branched, lateral seta nude or with one or two branches (nude in holotype); tarsus with seven branched setae and a tarsala (7 μ). Palpal claw curved, with a stout central prong and two accessory prongs.

Legs: Leg I coxa, trochanter, and basifemur each with one branched seta; telofemur with five branched setae; genu with four branched setae, two genualae (three on one genu of one paratype) and a microgenuala; tibia with eight branched setae, two tibialae and a microtibiala; tarsus with approximately nineteen branched setae, tarsala (12–15 μ), microtarsala, pretarsala, and subterminala (no parasubterminala). Leg II coxa and trochanter each with one branched seta; basifemur with two branched setae; telofemur with four branched setae; genu with four branched setae and a genuala; tibia with six branched setae and two tibialae; tarsus with approximately seventeen branched setae, a tarsala (13–15 μ), and a pretarsala. Leg III coxa with three (rarely four) branched setae; trochanter with one branched seta; basifemur with two branched setae; telofemur with three branched setae; genu with three branched setae and a genuala; tibia with six branched setae and a tibiala; tarsus with approximately fourteen branched setae, the longer setae with attenuated tips; occasionally with branches restricted to the basal portion resembling mastitarsalae.

Punctae of legs large and prominent, especially on distal segments.

Type material. Holotype, KU slide number 7201, and 28 paratypes, KU 7202–7229, from 10½ miles west of Hardtner, Barber County, KANSAS, from four red-headed woodpeckers, *Melanerpes erythrocephalus* (Linnaeus), field no. RL520726-9, shot on July 26, 1952, by R. B. Loomis and D. A. Crossley, Jr.

The holotype and paratypes are deposited in the Snow Entomological Museum, University of Kansas. Paratypes will be sent to the United State National Museum; the Rocky Mountain Laboratory, Hamilton, Montana; the British Museum (Natural History); Dr. G. W. Wharton, University of Maryland; the South Australian Museum; and the Museum National d'Histoire Naturelle, Paris, France.

Additional specimens examined (in the Snow Entomological Museum at the University of Kansas). *Neoschöngastia brennani.* Total 29 larvae, as follows: KANSAS. *Barber County:* 10½ miles west of Hardtner, *Tyrannus tyrannus,* July 27, 1952, KU 7230; *Chondestes grammacus,* July 26, 1952, KU 7231. *Seward County:* 12 miles northeast of Liberal, *Muscivora forficata,* September 9, 1948, KU 7232–7234. COLORADO. *Boulder County:* 8 miles north, 2 miles west of Boulder, *Chondestes grammacus,* August 13, 1947, KU 7235–7251. *Lincoln County:* 4 miles east of Limon, *Calamospiza melanocorys,* August 15, 1947, KU 7252–7258.

Neoschöngastia americana. Total, 284 larvae as follows: KANSAS. Anderson Co. (13); Bourbon Co. (1); Douglas Co. (201); Jefferson Co. (5); Montgomery Co. (7); Rawlins Co. (5) and Shawnee Co. (3); these specimens will be reported in detail by Loomis in a forthcoming paper. MISSOURI. *Jasper Co.:* 6 mi. N Carthage, *Sylvilagus floridanus,* Sept. 4, 1947 (10). OKLAHOMA. *Delaware Co.:* 4 mi. NW Grove, Sept. 11, 1947, *Sceloporus undulatus* (3) and *Richmondena cardinalis* (4). ARKANSAS. *Washington Co.:* Fayetteville, *Toxostoma rufum,* Sept. 10, 1947 (3). LOUISIANA. *Caddo Parish:* Rhodessa, *Vireo griseus,* March 27, 1948 (18). TEXAS. *Bexar Co.:* Camp Bullis, 17 mi NW San Antonia, *Lepus californicus,* July 15, 1953 (1). *Cameron Co.:* 5 mi. SW Brownsville, *Crotophaga sulcirostris,* Sept. 5, 1952 (1). *Zavala Co.: Chondestes grammacus,* June 25, 1952 (1); *Geococcyx californicus,* Sept. 18, 1952 (2), Oct. 20, 1952 (2); *Pyrrhuloxia sinuata,* June 17, 1952 (4).

Remarks. In Brennan's (1951) key to the species of *Neoschöngastia, brennani* will key out to *americana,* from which it

may be separated by the characters noted in the diagnosis. The best of these characters appears to be the two genualae I of *brennani,* as opposed to three genualae I of *americana.* In the type series of *brennani,* one of twenty-nine specimens had three genualae I on one leg and two on the other. No such deviations were found among the other specimens referred to this species, nor have we seen any deviations from three genualae I among series of *americana.*

Differences between the two species were first noted by L. J. Lipovsky; its distinctiveness is substantiated by examination of nymphs, where differences between these species are more striking than in the larvae. Nymphs of *brennani* have flagelliform sensillae and lack teeth on the chelae, in contrast to sub-clavate sensillae and pronounced teeth on the chelae of *americana* from eastern Kansas. A complete description of the nymphal stage will be given by one of us (Crossley) at a later date.

Acknowledgments. For aid in obtaining larvae of *Neoschöngastia,* we wish to thank Dr. Richard B. Eads, Principal Entomologist of the Texas State Department of Health; and former members of the University of Kansas Chigger Project, especially Mr. L. J. Lipovsky. We also express our appreciation to Dr. Charles D. Michener for reading the manuscript.

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New Conopidae from South America, Africa, and Australia (Diptera)

By Sidney Camras, Chicago, Illinois

The following novelties suggest the paucity of our knowledge of this conspicuous family outside of Europe and North America. Material has been examined from the U. S. National Museum and the British Museum through the courtesy of C. S. Sabrosky, F. van Emden, and H. Oldroyd.

Tropidomyia alexanderi new species

Holotype male: Front blackish brown, vertex yellowish, ocellar swelling blackish, ocelli yellow. Frontal orbit gold pollinose with velevty black spot near facial junction. Face gold pollinose, keel and oral margin shiny black. Cheeks less pollinose, brownish beneath the pollen. Occiput brownish, post-orbitals gold pollinose. Antennae brownish yellow, lighter at base, arista darker. First antennal segment hardly two times as long as wide, second segment about five times length of first. Third segment two times length of first. Aristal process and apex subequal, as long as wide. Proboscis blackish brown, one and one-half times length of head.

Thorax dorsally and postnotum blackish, faint yellow pollinose especially near humeri. Humeri and scutellum brownish red. Pleura yellowish brown, partly pollinose. Coxae brown, yellow gray pollinose; femora and tibiae brownish, faintly pollinose; tarsi and claws blackish, pulvilli yellow. Wings hyaline with brown pattern from costa to anterior half of submarginal cell, and along vena spuria, fifth, and sixth veins. Halteres yellow with club blackish.

Abdomen and genitalia black, second to fifth segments with gold pollinose distal margins. Sixth segment nearly all yellow pollinose, as long as wide. Length: 9 mm, without antennae.

Allotype: Similar to the type, but pollinose areas more grayish, less golden. Theca flexed anteriorly; as long as wide; posterior surface somewhat triangular. Sixth abdominal segment shorter than wide. Length: 9 mm, without antennae.

Holotype male and *allotype,* Maracaju, Matto Grosso, BRAZIL, May 1937, R. C. Shannon (U. S. National Museum). *Paratypes,* 3 males, 1 female, same data as types; 3 males, Rio Claro, Sao Paulo, BRAZIL, July, Oct. 1939, Claretiano (USNM); 1 male, Sao Paulo, BRAZIL, Hammar (author's cn., ex Cornell U.); 1 male, Annapolis, Goyaz, BRAZIL, Sept. 16, 1936 (USNM); 1 female, Villarica, PARAGUAY, May 1938, F. Schade (author's cn., ex Sabrosky).

This species is remakably similar in coloration to *bimaculata,* there being no reliable color differences. However the structural differences are very distinct and constant in the series examined. Three males and four females of *bimaculata* from Maracaju, Matto Grosso, Brazil, and San Rafael, Vera Cruz, Mexico (USNM) are at hand for comparison. The two neotropical species of this genus differ as follows:

1. First antennal segment four times as long as wide. Sixth abdominal segment longer than wide. Theca of female longer than wide.....*bimaculata* Will.
   First antennal segment two times as long as wide. Sixth abdominal segment in both sexes, and theca, not longer than wide.....*alexanderi* n.sp.

This new species was recognized by Shannon, and his manuscript name has been used. It was evidently intended to honor Prof. C. P. Alexander with whom Shannon spent some of his early days at Cornell.

Euconops rufus new species

Holotype female: Front and vertex rufous. Ocellar swelling black. Face and cheeks yellow. Velvety black mark at frontofacial junction of orbital, and at junction of facial and oral keel. Upper occiput rufous; lower occiput yellow. Antennae black except brownish first segment. Second segment as long as first; third segment three times at long as first. Lateral process of arista very small. Proboscis black, about as long as head height.

Thorax rufous with white pollinose pleural stripe and coxae. Legs black, tibiae white pollinose, pulvilli yellow. Wings hy-

aline, faintly yellow anteriorly. Petiole of first posterior cell as long as anterior cross-vein. Calypteres and halteres yellowish white.

Abdomen rufous. White pollinose posterior margins on segments one and two, and sides of segment three. Theca long and slender, two times as long as wide; black posterior serrate area on distal half. Genitalia black. Length: 9.5 mm, without antennae.

Holotype female, Emali Range, Sultan Hamud, KENYA, 4,900–5,000 feet, 3–40. (British Museum.)

Referral of this species without metallic blue to *Euconops* precludes this color as a generic character. I find no significant difference between the antennae of *Euconops* and *Pleurocerinella*. The two genera may be separated as follows:

1. Head as long as high, nearly quadrate. No hairs on face and cheeks. Labellae of proboscis chitinous....*Euconops*
   Head higher than long. Hairs on face and cheeks. Labellae fleshy and haired.....*Pleurocerinella*

In Kröber's key to the genera (Annals and Mag. Nat. Hist., Ser. 11, Vol. 4, 1939, page 363), the new species keys out to the Australian *Chrysidiomyia,* which differs in having a large thick third antennal segment two times as long as the second segment, and the usual "Conops"-shaped head.

Stylogaster parva new species

Holotype male: Vertical triangle which extends to base of antennae shining brownish black. Front and adjacent vertex velvety black. Orbital margin silvery white. Face silvery white becoming brownish at very narrow cheeks. Occiput blackish, white pollinose especially below. First antennal segment yellowish, as long as wide. Second antennal segment two and one-half times length of first, blackish brown darker at anterior and upper margin. Third antennal segment two times length of second, brownish black, more brownish at base, more black at margins. Dorsal margin of third antennal segment concave, ventral margin convex. Arista more than half length of third antennal segment, black with very short hairs (pubes-

cent). Proboscis black, yellowish at base and labellae. Proximal segment two times head height.

Thorax dorsally, scutellum, and lower three-fourths of postnotum shining black. Humeri and pleura yellowish, pleura somewhat brownish above. Anterior and middle coxae yellowish, posterior coxa blackish yellow. Legs yellowish with black hairs, darker on the tarsi. Posterior leg more blackish. Posterior femur blackish brown with a central yellowish band twice width of femur. Wings hyaline. First posterior cell slender, narrower than submarginal, width at posterior cross-vein about equal to width at distal third. Halteres yellowish at stalk, blackish brown at club.

Abdomen shining blackish brown. First and second segments yellowish laterally except posterior margin, laterally projecting hairs black. Third and fourth segments more extensively yellow leaving dark only in midline and at posterior margin. Genitalia yellowish. Length: 4½ mm, without antennae.

Allotype: Similar to the type but yellowish areas more prominent and more distinct from the blackish areas. Most of the ovipostitor is missing, but a portion about equal to one-third of the proximal segment is present. It is compressed laterally, yellowish at the base and sharply black distally. Length: 5 mm, without ovipositor.

Holotype male, Kawanda, UGANDA, July 31, 1942, H. Hargreaves (British Museum). *Allotype* female, Melsetter, S. RHODESIA, Feb. 1929, (U. S. National Museum).

This species is related to *nitens* and *nitidula* having the narrow first posterior cell. From *nitens* it differs by the dark arista and brownish black third antennal segment. From *nitidula* it differs by having black hairs on the legs and the yellowish band on the posterior femur.

Stylogaster subapicalis new species

Holotype female: Vertical triangle which extends to base of antennae shining black with narrow yellow margin. Ocelli yellow. Front and adjacent vertex yellow. Anterior orbits

white pollinose. Face and narrow cheeks pale yellowish, with white pollen. Occiput blackish at upper margin, white pollinose below. Antennae yellowish, third segment nearly orange. Second segment with black hairs at upper and lower portions. Arista black, as long as third antennal segment. First antennal segment shorter than width. Third segment one and one-half times the second. Proboscis black, yellowish at base and labellae. Proximal segment nearly three times head height.

Thorax brownish dorsally, on scutellum, and on lower half of postnotum; yellowish on humeri, sides of dorsum, and pleura. Bristle at propleural ridge black. Legs yellowish, more orange on posterior coxa and hind femur. Distal half of anterior and middle tarsi blackish, posterior tarsi entirely black. Hind tibia blackish except yellow distal half above ventral margin. Hairs black; yellow on anterior and middle tibiae and first tarsal segments, and part of distal dorsal surface of posterior tibia. Wings hyaline. First posterior cell broad, greatest width at distal third, wider than submarginal cell. Halteres yellow.

Abdomen yellowish, darker on distal segments. Narrow posterior margins brownish. Lateral hairs of first segment yellow, of second segment black. Distal segment of ovipositor black on proximal half, leaving the genitalia yellow. Length: 10 mm, without antennae; of which ovipositor is 4 mm.

Allotype: Similar to the type. Third antennal segment twice length of second. Posterior tibia more blackish proximally and on ventral margin of distal third. Yellow hairs on posterior tibia more extensive, covering dorsal and lateral part of distal third.

Holotype female, Lolodorf, CAMEROON, July 3, 1920, A. I. Good (author's cn., ex Carnegie Museum). *Allotype* male, Obuasi, Ashanti, GOLD COAST, July 25, 1907, W. M. Graham (British Museum). *Paratypes,* 1 female, Njala, SIERRA LEONE, March 1, 1934, E. Hargraeves (British Museum), 1 female, Bwamba, UGANDA, June 1948, van Someren (British Museum), 1 female, CAMEROON, Oct. 19, 1914, A. I. Good (author's cn., ex Carnegie Museum), 1 male, Marshall, LIBERIA, Feb. 4, 1952, (USNM).

This species is very similar to *leonum* differing only by the dark area on the ovipositor, and a black instead of yellow bristle at the propleural ridge. Both species have more rufous or more melanistic individuals. In *leonum* the hairs on the sides of the first and second abdominal segments are yellow in the rufous individuals and black in the darker specimens. But in the new species, all of the specimens examined have the lateral hairs on the first segment yellow and on the second segment black.

Occemyia australiana new species

Holotype male: Vertex and upper half of front black. Lower half of front yellow-orange. Orbits white pollinose. Face and cheeks yellow pollinose. Upper occiput black, partly white pollinose. Lower occiput yellow, white pollinose. Antennae yellowish, more orange on third segment. Distal margin of first segment, upper margin of second segment, distal half and upper margin of third segment, and arista black. Second and third segments equal, each two times length of first segment. Proboscis black, the two segments equal. Palpi black, longer than width of proboscis and somewhat club-shaped.

Thorax black. Dorsum with white pollen, more distinct laterally and in the grooves. Pleura white pollinose in many areas. Anterior coxae yellow. Legs yellow, black on apical half of anterior and middle femora and apical third of posterior femur. Tibiae black on distal two-thirds; tarsi black on distal two segments, and apex of claws. Wings hyaline, yellowish at base. First posterior cell open at margin. Calypteres and halteres yellowish.

Abdomen black with white pollen forming distinct posterior margins on sides of second, third, and fourth segments. Genitalia shining black. Length: 4.5 mm, without antennae.

Allotype female: Similar to the male, but yellowish areas more extensive. The black areas on the legs paler, and less distinct from the yellow. Black on apical third of anterior and middle femora, and on somewhat less than apical third of hind femur. Theca black, paler in the middle, yellowish posteriorly with narrow black margin; moderately long and thin, sides parallel, as long as wide.

Holotype male, New South Wales, AUSTRALIA, Dec. 1923, H. Peterson (U. S. National Museum, ex Malloch). *Allotype* female, Botany Bay, New South Wales, AUSTRALIA, H. Peterson (U. S. National Museum, ex Malloch).

This is the first species of this genus to be described from the Australian Region. The genus is now known from all parts of the world except the Neotropical Region south of Guatemala and Haiti.

Undescribed Species of Crane-Flies from the Western United States and Canada (Dipt.: Tipulidae) Part XV

By CHARLES P. ALEXANDER, University of Massachusetts, Amherst, Massachusetts

The preceding part under this general title was published in ENTOMOLOGICAL NEWS 66: 15–21, 1955. The species considered herewith were taken chiefly by myself while on various collecting trips to the far west. I am greatly indebted to Mr. Borys Malkin for one unusually interesting species from Arizona.

Tipula (Trichotipula) malkini new species

Size large (wing, male, over 14 mm.); mesonotal praescutum grayish brown, the interspaces darker brown, producing a conspicuous pattern; femora brownish yellow, the tips blackened; wings cream-yellow, handsomely variegated with brown; cell *1st* M_2 small; male hypopygium with the beak of the inner dististyle heavily blackened, long and slender; outer basal lobe conspicuous.

♂. Length about 16 mm.; wing 14.5 mm.

Frontal prolongation of head shiny brown; nasus long and slender; palpi dark brown, the incisures pale. Antennae with the scape and pedicel yellowish brown; flagellum broken. Head with the front, vertex surrounding the antennal bases and the

orbits yellow; posterior vertex brownish gray, with a capillary black central vitta; vertical tubercle low and rounded, entire.

Mesonotal praescutum with the stripes and lateral borders grayish brown, the interspaces dark brown, appearing as a central vitta, lateral borders to the intermediate stripes and as margins encircling the lateral stripes, the central vitta becoming obsolete on the posterior half of the sclerite; scutum dark gray, the lobes conspicuously patterned with brown, including a ring on mesal half and darkened spots at the outer angles; posterior sclerites of notum paler gray, the scutellum with a narrow blackened line; mediotergite darkened on more than the cephalic half of the disk. Pleura and pleurotergite brownish gray, vaguely patterned with obscure yellow, most evident on the dorsal anepisternum, dorsal sternopleurite and across the pteropleurite; dorsopleural membrane chiefly whitened. Halteres with stem yellow, knob dark brown. Legs with the coxae dark brown, sparsely pruinose; trochanters yellow, restrictedly patterned with darker; femora and tibiae brownish yellow, the tips narrowly but conspicuously black, broader on the femora; tarsi elongate, black; claws (male) with a long basal spine. Wings with the restricted ground cream-yellow, best indicated in the cells beyond the cord and in the cubital field; cells *R*, *M* and the Anals with the ground more infuscated; a conspicuous darker brown pattern, as follows: Distal ends of outer radial cells; central streaks in cells R_5 to M_4, the outer medial veins similarly seamed back from the margin; isolated dark spots in outer end of cell *M* and at near midlength of cell *Cu;* stigma still darker brown, conspicuous; veins dark brown, paler in the costal field. Rather abundant macrotrichia in outer ends of cells R_5, M_1 and *2nd* M_2. Venation: *Rs* shorter than *m-cu;* petiole of cell M_1 about twice *m;* cell *1st* M_2 small, irregularly pentagonal, M_{3+4} shortest.

Abdominal tergites obscure yellow, patterned with dark brown, including the disk of the first segment; succeeding segments darkened laterally, outer ones more extensively darkened; sternites yellowed; male hypopygium brownish yellow. Male hypopygium with the ninth tergite transverse, narrowed out-

wardly, the posterior border with a broad U-shaped notch; posterior margin with abundant black spinous setae, stouter and more abundant at and near the lateral angles; setae of disk yellow. Outer dististyle an oval lobe, about two and one-half times as long as broad, with abundant dark setae. Inner dististyle produced into a long slender blackened beak, the lower beak shorter, similarly blackened; bases of beaks with some very long black setae; dorsal crest appearing as a high yellow blade behind the beak, provided with long yellow setae; outer basal lobe conspicuous, only a little smaller than the outer dististyle, oval, narrowly obtuse at apex; surface with abundant delicate setulae, with a few erect black setae on lower part.

Habitat. ARIZONA. *Holotype:* ♂, Stewart Forest Camp, Cave Creek Canyon, Chiricahua Mountains, September 14, 1952 (Borys Malkin).

I am pleased to name this handsome crane-fly for the collector, to whom I am greatly indebted for many species from the Western United States and Alaska. It is quite distinct from other regional forms in the large size and conspicuously patterned wings, together with the structure of the male hypopygium. In the nature of the wing pattern it is most as in *Tipula* (*Trichotipula*) *capistrano* Alexander, *T.* (*T.*) *geronimo* Alexander, and some others, yet entirely distinct.

Limonia (Rhipidia) huachucensis new species

Size large (wing, male, over 9 mm.); general coloration of head and thorax gray, patterned with brown; antennae (male) black, the flagellar segments unipectinate, the branches exceeding the segments in length; knobs of halteres brownish black; femora brownish yellow, the tips rather narrowly dark brown, tibiae and tarsi brownish black; wings whitish subhyaline, patterned with pale brown, the areas chiefly costal in distribution; *Sc* relatively long, Sc_1 ending nearly opposite two-thirds *Rs; m-cu* at fork of *M;* male hypopygium with the posterior border of tergite convexly rounded, with a relatively small subcircular median notch; gonapophysis with mesal-apical lobe unusually long and slender.

♂. Length about 8.5 mm.; wing 9.5 mm.; antenna about 1.5 mm.

Rostrum dark brown; palpi black. Antennae black, the apical pedicels of the flagellar segments paling to brownish yellow; flagellar segments long-unipectinate, the longest branches exceeding the segments; eleventh flagellar segment merely produced. Head gray, the central part of posterior vertex more darkened; anterior vertex narrow, only about one-third the diameter of the scape.

Pronotal scutum brownish gray medially, paler on sides; scutellum obscure yellow. Mesonotal praescutum gray, patterned with dark brown, including two intermediate stripes that are virtually confluent behind, on anterior half replaced by darker gray, variegated by a capillary blackened line and row of about three blackened spots on the outer margin of the stripe; lateral stripes scarcely darker than the ground, patterned with dark spots at and near their anterior ends; humeral region of praescutum more reddened; posterior sclerites of notum light gray, each scutal lobe with a narrow dark brown longitudinal vitta; mediotergite with a less evident capillary darkening. Pleura gray, patterned longitudinally with vague darker lines; a small black dot immediately beneath the wing root. Halteres with stem pale, knob brownish black. Legs with the coxae pale brown, each with a darker spot on outer face, least distinct on the midcoxae; trochanters yellow; femora brownish yellow, the tips rather narrowly dark brown; tibiae and tarsi brownish black. Wings whitish subhyaline, patterned with pale brown, the areas chiefly costal in distribution; four costal darkenings before the stigma, the outer ones subequal to the interspaces; stigma yellow, the ends darker; cord and outer end of cell *1st* M_2 narrowly seamed with brown; outer cells of wing with pale brown central washes; a small brown cloud near outer end of vein *2nd A;* veins pale brown. Venation: *Sc* relatively long, Sc_1 ending nearly opposite two-thirds the length of *Rs,* Sc_2 near its tip; M_{3+4} longer than M_4; *m-cu* at fork of *M*.

Abdomen with the basal tergites bicolored, restrictedly pale basally, more broadly darkened on posterior part; outer ter-

gites uniformly dark brown; sternites pale yellow. Male hypopygium with the tergite transverse, the posterior border convexly rounded, with a relatively small subcircular median notch; setae relatively long and abundant, chiefly restricted to the lobes. Basistyle with the ventromesal lobe simple, bearing a low setiferous flange near base. Dististyles broken. Gonapophysis with the mesal-apical lobe unusually long and slender, the narrow apex a trifle decurved.

Habitat. ARIZONA. *Holotype:* ♂, Garden Canyon, Huachuca Mountains, Cochise County, altitude 5200 feet, July 26, 1949.

The present fly is quite distinct from the other Nearctic members of the subgenus, somewhat suggesting a very large *Limonia* (*Rhipidia*) *domestica* (O.S.) but differing in the antennal structure and coloration, and in the details of the male hypopygium.

Pedicia (Tricyphona) aethiops new species

Size medium (wing, male, under 9 mm.); general coloration dark brown, the praescutum with three more blackened stripes; legs black, only the femoral bases restrictedly obscure yellow; wings with a strong blackish tinge; vein R_{4+5} normally present, longer than the basal section of R_5, producing a venation much as in *diaphana;* cell M_1 present; male hypopygium with the tergite large, its caudal margin with a deep V-shaped notch, producing broad lateral lobes; no lateral tergal arms or interbasal processes; basistyle with two apical lobes, the larger one oval with subappressed black spines; a single long-subtriangular sclerotized dististyle.

♂. Length about 9 mm.; wing 8.5–9 mm.

Head gray, palpi and antennae black.

Thorax almost uniformly dark brown, sparsely pruinose, the praescutum with three more blackish stripes, the centers of the scutal lobes similarly darkened, the markings ill-defined against the ground; posterior borders of scutal lobes and the parascutella yellowed; dorsal part of pleurotergite vaguely pale. Halteres relatively long, dark brown, the base of stem pale.

Legs with the coxae dark brown; trochanters obscure yellow; remainder of legs black, the femoral bases restrictedly obscure yellow. Wings with a strong blackish tinge, the oval stigma still darker, its limits ill-defined; a pale streak in cell *R* adjoining vein *M*, reaching the cord; veins brown. Venation: *Rs* about equal in length to the distance between Sc_2 and its origin; vein R_{4+5} longer than basal section of R_5, producing a venation virtually as in *diaphana* or *exoloma;* cell M_1 present; *m-cu* from about one-third to nearly two-thirds the length of the cell. The paratype specimens show a considerable tendency to variation in certain fields of the wing.

Abdomen, including hypopygium, black. Male hypopygium with the tergite large, the caudal margin with a deep V-shaped emargination to form broad lateral lobes, these pale at apex and here provided with abundant short black setae; remainder of dorsal surface, with the exception of the cephalic third, with rather abundant long strong setae; no lateral tergal arms. Basistyle apparently without an interbasal lobe; two apical lobes, the smaller dorsal one blackened, the margin smooth, surface with long setae; larger lobe oval, with subappressed black spines, those at and near the summit larger. Dististyle a long-subtriangular sclerotized structure, narrowed to the obtuse tip.

Habitat. BRITISH COLUMBIA, ALBERTA, MONTANA. *Holotype:* ♂, Along Miette River, below Yellowhead Pass, Jasper National Park, Alberta, altitude 3650 feet, July 24, 1949 (C. P. Alexander). *Paratypes:* ♂, Glacier National Park, Montana, along trail from Two Medicine Lake to No-Name Lake, June 1952 (D. L. Carson and M. E. Smith); several specimens in University of Michigan Collection, Goldstream Park, Vancouver Island, British Columbia, April 3–4, 1950 (Richard Guppy).

The venation of the present fly is very much as in *Pedicia* (*Tricyphona*) *diaphana* (Doane) or *P.* (*T.*) *exoloma* (Doane), but the male hypopygium is entirely different from that in members of this group, being generally more as in certain species that have been referred to the genus *Dicranota,* as *Dicranota* (*Rhaphidolabis*) *stigma* (Alexander) and *D.* (*R.*) *uniplagia* Alexander.

Limnophila lobifera new species

Size medium (wing, male, 10 mm.); general coloration of praescutum brownish yellow, with four brownish black stripes; pseudosutural foveae black, conspicuous; antennae (male) elongate, black throughout; halteres pale yellow; femora yellow basally, the tips blackened, tibiae and tarsi black; wings faintly tinged with yellow, restrictedly patterned with brown; *Rs* relatively long, nearly four times *m-cu;* cell *1st* M_2 narrow, widened outwardly; male hypopygium with the basistyle produced into a conspicuous lobe; apex of outer dististyle divided into two inconspicuous teeth; phallosome with the aedeagus very small, the subtending apophyses with microscopic spines.

♂. Length about 10 mm.; wing 10 mm.; antenna about 4 mm.

Rostrum dark brown; palpi black. Antennae black throughout, relatively long, only a little less than one-half the wing; flagellar segments elongate-oval, longer than the verticils; segments with a further conspicuous erect pubescence. Head dark gray; a weak tubercle on anterior vertex behind the antennal fossae; anterior vertex glabrous, posterior vertex with abundant black setae.

Pronotum dark gray. Mesonotal praescutum with the ground brownish yellow, with four conspicuous brownish black stripes, the intermediate pair only slightly separated; pseudosutural foveae large and conspicuous, black; posterior sclerites of notum light gray, the lateral parts of the lobes and the parascutella blackened. Pleura dark gray; dorsopleural membrane darkened. Halteres pale yellow. Legs with the coxae yellow, sparsely pruinose, the fore pair more heavily so and narrowly darkened at base; trochanters yellow; femora yellow basally, passing into brownish yellow, the tips narrowly blackened; tibiae and tarsi black. Wings faintly tinged with yellow, the prearcular and costal fields a little more so; a restricted brown pattern, including areas at origin of *Rs*, cord and outer end of cell *1st* M_2; stigma; forks of R_{2+3+4} and M_{1+2}, and as evident seams over vein *Cu* and outer end of *M;* veins light brown, darker in the patterned areas, brightened in the costal and pre-

arcular fields. Venation: *Rs* relatively long, as compared to the species of the *ferruginea* group, nearly four times *m-cu*; R_{1+2} only about one-half R_2; cell *1st* M_2 narrow, widened outwardly, with *m-cu* at or beyond midlength; cell M_1 a little longer than its petiole.

Abdominal tergites more or less infuscated medially, the sides obscure yellow; sternites clearer yellow; a narrow black subterminal ring; hypopygium obscure yellow. Male hypopygium with the basistyle produced into a stout lobe. Outer dististyle moderately broad, as compared with *bigladia* and allies, glabrous, the apex narrowed and blackened, split into two inconspicuous teeth; inner dististyle a little smaller, narrowed into a slender straight rod, the apex blackened, obtuse. Phallosome including a very small aedeagus, subtended by darkened inturned apophyses, the tips of these with microscopic spines; a second pair of flattened paddle-like outer gonapophyses.

Habitat. BRITISH COLUMBIA. *Holotype:* ♂, Alaska Highway Mile Post 128, June 25, 1952 (C. P. Alexander); along small stream, swept from willow, dwarf birch and shrubby cinquefoil.

The most similar species include the Palaearctic *Limnophila conifera* Lackschewitz and *L. pernigrita* Alexander, which differ in the structure of the male hypopygium. It does not appear to me that *conifera* is a synonym of *L. squalens* Zetterstedt, as has been indicated by some authors.

Nomenclature Notice

All comments relating to the following should be marked with the file number and sent to Francis Hemming, 28 Park Village East, Regent's Park, London N.W.1, England.

Entomobrya Rondani, 1861 (Order Collembola), validation of (pp. 75–77) (File: Z.N.(S.)485).

For details see: *Bull. Zool. Nomencl.* Vol. 11, Part 3.

Entomological Departments

Believing such material to be of interest to its readers, ENTOMOLOGICAL NEWS herewith solicits articles similar to the one here presented and giving information on the organization and activities of entomologists in colleges, universities, museums, and in government and other groups.

University of California

THE DEPARTMENT OF ENTOMOLOGY AND PARASITOLOGY

(Berkeley—Davis)

In the University of California, research in Entomology is carried on at Albany, Berkeley, Davis, Los Angeles and Riverside. For administrative purposes, there are three departments: BIOLOGICAL CONTROL (Riverside, Albany and Berkeley); ENTOMOLOGY (Riverside and Los Angeles); and ENTOMOLOGY AND PARASITOLOGY (Berkeley and Davis). The Departments of Biological Control and Entomology are primarily research units of the AGRICULTURAL EXPERIMENT STATION. The Department of Entomology and Parasitology is responsible for the instructional program as well as for research in the northern part of the state.

The academic program in entomology was initiated sixty-four years ago at Berkeley, when C. W. WOODWORTH, in 1891, was appointed Assistant Professor of Entomology, the first trained entomologist to assume teaching responsibilities in the state. For twenty-nine years Professor Woodworth headed the entomological activities of the University as chairman of the Division of Entomology, Department of Agriculture. In 1920, W. B. HERMS, Professor of Parasitology, succeeded Professor Woodworth and the name of the Division was changed to Entomology and Parasitology. From 1943 to 1952, under the chairmanship of E. O. ESSIG, the academic program assumed much of its present form. In 1952, the Division became a separate Department in the College of Agriculture (Berkeley—Davis).

During the Woodworth period a number of students were graduated with a major in entomology and several received the M.S. degree. The first Ph.D. in entomology was awarded in 1924. Since then, 143 Ph.D. degrees have been conferred in Entomology and Parasitology (15 to students from foreign

countries). Of the recipients, 12 hold purely academic positions, 36 are in combined University teaching and research, 57 are in research positions in public agencies (federal, state, etc.), 15 are in industrial research, 3 are practicing medicine, and 9 are in academic or research administration.

Since 1924 instruction, particularly in the applied phases of entomology, has been given on the Davis campus under the administration of this Department (or Division). At the present time, work leading to the B.S. degree with a major in Entomology is offered at Davis and also graduate instruction leading to the M.S. and Ph.D. degrees. All graduate instruction in entomology on various campuses of the University (Berkeley, Davis, Riverside) is administered by the Department of Entomology and Parasitology. Limited undergraduate instruction in Entomology is offered on the Los Angeles campus by the Department of Entomology (Riverside—Los Angeles).

The principal fields of emphasis in the graduate academic program are: AGRICULTURAL ENTOMOLOGY (Berkeley, Davis and Riverside); APICULTURE (Davis only); BIOLOGICAL CONTROL (Berkeley and Riverside); FOREST ENTOMOLOGY (Berkeley only); INSECT ECOLOGY (Berkeley and Davis); INSECT MORPHOLOGY and PHYSIOLOGY (Berkeley and Davis); INSECT PATHOLOGY (Berkeley only); INSECT TOXICOLOGY (Berkeley and Davis); INSECT VECTORS OF PLANT DISEASES (Berkeley only); PARASITOLOGY (Berkeley only); PLANT NEMATOLOGY (Berkeley only); SYSTEMATIC ENTOMOLOGY (Berkeley and Davis).

The Berkeley faculty and resident staff is as follows: M. W. ALLEN (Associate Professor of Plant Nematology), W. W. ALLEN (Assistant Entomologist), A. D. BORDEN (Entomologist Emeritus), P. F. BONHAG (Assistant Professor of Entomology), R. CRAIG (Professor of Entomology), R. L. DOUTT (Associate Professor of Biological Control), E. O. ESSIG (Professor of Entomology, Emeritus), N. W. FRAZIER (Lecturer in Entomology), J. H. FREITAG (Professor of Entomology), D. P. FURMAN (Associate Professor of Parasitology), H. T. GORDON (Lecturer in Entomology), W. M. HOSKINS (Professor of Entomology), P. D. HURD, JR. (Assistant Entomologist),

D. D. JENSEN (Associate Professor of Entomology), E. G. LINSLEY (Professor of Entomology and Chairman of the Department), J. W. MACSWAIN (Assistant Professor of Entomology), H. F. MADSEN (Assistant Entomologist), A. E. MICHELBACHER (Associate Professor of Entomology), W. W. MIDDLEKAUFF (Associate Professor of Entomology), A. D. MOORE (Assistant Specialist in Forest Entomology), A. E. PRITCHARD (Associate Professor of Entomology), H. H. P. SEVERIN (Entomologist, Emeritus), R. F. SMITH (Associate Professor of Entomology), E. A. STEINHAUS (Professor of Insect Pathology), M. A. STEWART (Professor of Parasitology), E. S. SYLVESTER (Assistant Professor of Entomology), and R. L. USINGER (Professor of Entomology).

At Davis the faculty in Entomology includes: O. G. BACON (Assistant Professor of Entomology), S. F. BAILEY (Professor of Entomology and Vice-Chairman of the Department), R. M. BOHART (Associate Professor of Entomology), J. R. DOUGLAS (Associate Professor of Parasitology), J. E. ECKERT (Professor of Entomology), S. B. FREEBORN (Professor of Entomology), H. H. LAIDLAW (Associate Professor of Entomology), W. H. LANGE, JR. (Associate Professor of Entomology), D. J. RASKI (Lecturer in Entomology), L. M. SMITH (Professor of Entomology), E. M. STAFFORD (Associate Professor of Entomology), and F. M. SUMMERS (Associate Professor of Entomology).

At Riverside the graduate faculty includes: A. M. BOYCE (Professor of Entomology) and S. E. FLANDERS (Professor of Biological Control).

The distinction of the present faculty in Entomology and Parasitology is reflected in the number of outstanding authorities it contains. It also includes two ex-presidents of the Entomological Society of America, an ex-president of the American Association of Economic Entomologists, two Guggenheim Fellows, two editors and two former editors of entomological journals, an alternate member of the International Commission on Zoological Nomenclature, the American representative on the permanent committee of the International Congresses of Entomology, and numerous consultants to govern-

ment agencies such as the National Research Council, Pacific Science Board and others.

The academic program in Entomology and Parasitology has brought recognition to the Department as one of the leading centers of entomological training in the world. The department offers 21 undergraduate courses presenting the basic fields of insect morphology, physiology, classification, ecology and pathology; courses dealing with allied groups of animals (acarology, helminthology, and plant nematology); and courses in agricultural entomology (including biological control of insects and weed pests, forest entomology, insect vectors of plant disease, medical entomology, the chemistry of insecticides and fungicides, etc.). Ten graduate courses extend instruction through advanced courses in medical entomology, insect biochemistry, systematics, etc.

Most of the department's facilities for teaching and research are at Berkeley and Davis. The Berkeley headquarters of the department occupies 20,000 sq. ft. of space in Agriculture Hall, which also houses, in addition to laboratories and classrooms, the entomological museum, a well equipped insect toxicology research laboratory, and a 5,000-volume library of entomology. Graduate students also use space in the Hearst Avenue greenhouses, the insectary buildings and greenhouses on the nearby Oxford Tract, and the laboratories, greenhouse and insectary unit operated by the Department of Biological Control on the Gill Tract in Albany. The Davis campus provides, in addition to an insectary-greenhouse unit, a museum and the usual laboratories, the only university-maintained apiary in the state. At Riverside, the graduate students have access to excellent laboratory and insectary facilities of the Department of Entomology and the Department of Biological Control.

The California Insect Survey (research-survey collections, Berkeley) was organized in 1947 to serve as the basis for research studies on the insects of California. The objectives of the survey have been to explore the extent and nature of the insect fauna of the state, to assemble information on geographic ranges, distributions and ecologies, and to make this information available in summary form through the Bulletin

of the California Insect Survey. The UNIVERSITY OF CALIFORNIA PUBLICATIONS IN ENTOMOLOGY are reserved for research studies on systematics, biology, physiology and morphology which are of a more fundamental nature. The survey collections are available to qualified graduate students as are the outstanding collections of the California Academy of Sciences in nearby San Francisco.

The INSECTARY at Berkeley offers integrated laboratory and greenhouse facilities which permit the rearing and study of a wide variety of insects under controlled temperatures and humidities. Special facilities are available for the study of aquatic insects and other forms requiring specialized rearing conditions.

Current research projects of faculty and graduate students span the gamut of entomological problems. Students are encouraged to avail themselves of the extremely diverse ecological conditions which exist in California on the selection of problems and where possible support is offered in the form of research and teaching assistantships of which a number become vacant each year.

The BERKELEY CAMPUS of the University of California is situated on the eastern shore of San Francisco Bay, directly opposite the Golden Gate. The University grounds comprise five hundred and thirty acres, rising in gentle slopes to the Berkeley hills. From almost every part of the campus—and the city of Berkeley—there is a magnificent outlook over the bay and city of San Francisco, the neighboring plains and mountains, the Pacific Ocean, and the Golden Gate. Berkeley has a climate well suited for university work throughout the year, and extremes of heat and cold are unknown. The average temperature for the winter months is about 53 degrees; for the months of May, June, and July, about 60 degrees.

The 3,000-acre campus at DAVIS, in the heart of the agricultural Central Valley, is the largest, in area, of the University's state-wide system. About two-thirds of the acreage is devoted to crops and farm animals used for teaching, demonstration, and research. This campus specializes in the production fields of

agriculture, general home economics, and agricultural education. Adjoinging the city of Davis (about 5,000 population), in Yolo County, the Davis campus lies 13 miles west of Sacramento and 67 miles northeast of Berkeley. Climate is characterized by clear skies typical of the Central Valley, and is moderated by breezes from the Bay region that produce cool nights even in summer.—E. GORTON LINSLEY.

Orchopeas s. firemani, a new Woodrat Flea from Mexico

By C. ANDRESEN HUBBARD, Tigard, Oregon

I have before me at this time four males and five females of a flea taken off the Mexican Woodrat *Teanopus phenax* (type host) 35 miles north of Los Mochis on the border between Sinaloa and Sonora, MEXICO (type locality) on March 23, 1954, by Dr. Murray Johnson of Tacoma, Washington. I hold the flea to be undescribed and here name it

Orchopeas sexdentatus firemani, new subspecies.

The new subspecies seems to fall between *O. s. schisintus* Jord. '29 and *O. s. neotomae* Aug. '43 both from Arizona Woodrats. The modified segments of the new male are *schisintus*-like but the black spiniforms number only four, three below at the heel of the finger, the fourth some distance from the apex, just as if the fourth from the heel of *schisintus* had been dropped out; the VII st. of the new female is *neotomae*-like, the lobe being bold and block-like.

The *holotype* male and *allotype* female are mounted on one slide and will be deposited in the U. S. National Museum. Paratypes go to British Museum, Canadian National Museum and Philadelphia Academy of Natural Sciences.

This flea bears the name of Mr. Bert Fireman, Editor of "Under the Sun," The Phoenix Gazette, Phoenix, Arizona, who, on October 4, 1954, in his column humorously assailed this writer for naming *Meringis cochisei* (Ent. News, LXV, July 1954, p. 175) after Arizona's famous Apache Indian chief Cochise.

A New Species of Obrium from Tennessee. (Coleoptera: Cerambycidae)

By Josef N. Knull, Department of Zoology and Entomology, The Ohio State University, Columbus, Ohio

Obrium howdeni n. sp.

♀. Form and size of *Obrium maculatum* (Oliv.), black throughout, more shining above than below.

Head convex, confluently punctate on front between eyes, with a short median carina in this area, pubescence long, sparse.

Pronotum longer than wide, much wider in front than at base, widest in front of middle; anterior margin arcuate, basal margin truncate; sides constricted back of front margin, then broadly rounded forming an obtuse tubercle, back of which they are strongly convergent to a constriction at base; disk somewhat flattened with median raised area in front of basal constriction and one on each side about middle, a broad transverse depression back of apex and a deeper one in front of base; surface with scattered minute punctures, pubescence long, sparse.

Elytra at base wider than widest part of pronotum; sides subparallel near base, widened back of middle, apices separately rounded; disk somewhat flattened; surface with scattered small punctures, pubescence long, sparse.

Abdomen beneath with first segment shining, minutely punctured, second segment deeply emarginate, emargination bordered with long pubescence, following segments with long pubescence. Tibiae strongly clavate.

Length 6.6 mm.; width 1.6 mm.

Described from one female specimen collected at Reelfoot Biological Station, Obion Co., Tennessee, June 20–27, 1948 by Pfitzer and Scott and given to me by Henry F. Howden. Holotype in collection of author.

This species is closely related to *O. maculatum,* however it differs by being black throughout, pronotum more constricted at base and more sparsely pubescent elytra.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Cynipid and Itonidid galls—American species wanted; purchase or exchange for British species. Fresh or dried. D. Leatherdale, F.R.E.S., Old Woodstock, Oxford, England.

Wanted—Reprints or papers concerning insects taken in Alaska for inclusion in list of Alaskan insects. R. H. Washburn, Alaska Experiment Station, Palmer, Alaska.

Conopidae of the World wanted. Will pay 10¢ to $1.00 for pinned and labelled specimens. S. Camras, 4407 N. Milwaukee Ave., Chicago 30, Illinois.

Anisoptera—Nearctic sp. wanted for exchange, espec. Ophiog., Arigom., Aeschna, Neurocor., Somatoc., Cordulia, Dorocor., Leucor. R. D. Cuyler, Dept. of Entomology, N. C. State College, Raleigh, N. C.

Bembicini and Stizini (Hym., Sphec.) of New World wanted for revis. study. Will return upon request or at end of project. James E. Gillaspy, Dept. of Zoology, Univ. Texas, Austin 12, Texas.

Agapema galbina. Will exchange cocoons of this moth for nature books. E. Frizzell, Route 4, Box 96, San Benito, Texas.

Wanted—Data on exact location of colonies of *Epibembex* (olim *Bembix*) (Hymenoptera), any species, any part of country, for biological studies. Howard E. Evans, Dept. Entomology, Cornell Univ., Ithaca, N. Y.

Fanniinae wanted on loan (nearctic and holarctic), and information on collections. James G. Chillcott, Dept. Entom., Univ. of Kansas, Lawrence, Kan. (Loans may be charged to Dr. C. D. Michener.)

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